

## ELEVATOR APPARATUS PANEL SUBSCRIBER LINK REQUIREMENTS AND ADJUSTING PROCEDURES

### 1. GENERAL

**1.01** This section covers panel subscriber link elevator apparatus (12-type brushes, 9-type brush rods, 5-type guide rods, 2-type compensators, 1-type guides, and 3- and 4-type bearings).

**1.02** This section is reissued to incorporate material from the addendum in its proper location. In this process marginal arrows have been omitted.

**1.03** Reference shall be made to Section 020-010-711 covering general requirements and definitions for additional information necessary for the proper application of the requirements listed herein.

*Caution: Whenever adjustments are made on tripped multiple brushes, care shall be exercised to avoid crossing or grounding the brush spring on the terminal. If possible, set the brush on a spare or permanently made busy terminal while adjustments are being made. Then recheck the adjustments on the reference terminal.*

**1.04** *Brush contact spring pressure* is that which it is necessary to overcome to start a brush contact spring away from its associated bank terminal when the gauge is applied at a point on the spring approximately 1/4 inch from the end of the spring.

**1.05** *The 1-type guide*, which is mounted in an inverted position on the sender selector brush rod, serves as an upstop collar.

**1.06** *Reference Terminal Alignment:* A visual inspection shall be made before checking or readjusting any brush to insure that the reference terminal and the associated tip and ring terminals of the same circuit group of terminals by which the brush is to be set are cor-

rectly aligned horizontally and vertically with respect to the other terminals in the bank.

**1.07** *Make-busy Information:* Before making any of the inspections or readjustments covered by this section, make the associated link circuit busy in the approved manner.

### 2. REQUIREMENTS

**2.01** *Rack Tongue Position:* Fig. 1(A)

(a) The rack tongue shall have sufficient tension to hold it against the rack coupling pin.

Gauge by feel.

(b) With the weight of the brush rod assembly resting on the rack or rack bearing washer, the rack tongue shall not touch any of the four sides of the slot in the brush rod.

Gauge by eye.

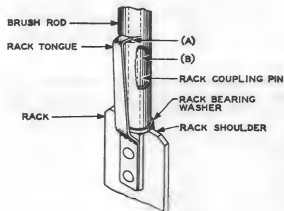


Fig. 1 - Brush Rod and Rack Parts

**2.02 Rack Coupling Pin Engagement: Fig. 1(B)**

— The rack coupling pin shall be sufficiently free in the brush rod to allow the rod to rest on the rack bearing washer or the shoulder of the rack and to prevent any twisting motion of the rack within the limits permitted by requirement 2.01 being transmitted to the rod.

Gauge by eye.

To check this requirement, raise the brush rod away from the rack as far as permitted by the play of the rack tongue in its slot, and make sure that when the brush rod is released, the brush rod drops back against the shoulder of the rack or the rack bearing washer, due to its own weight plus the weight of the compensator.

**2.03 Freedom of Movement of Brush Rod:**

Fig. 2(A) — A brush rod equipped with its associated compensator shall be sufficiently free in its bearings to return to the normal (down) position due to its own weight plus the weight of the rack when lowered slowly from any position on the bank with the pawl lifted.

Gauge by eye and by feel.

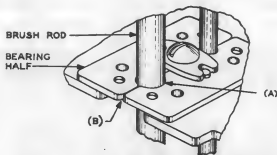


Fig. 2 - 3-Type Bearing

In checking this requirement proceed as follows. With the brush rod normal, insert the KS-6320 orange stick in back of the left side of the clutch pawl and draw the pawl forward so as to free the rack. Turn the orange stick so the flat surface is next to the clutch frame and push the orange stick downward so as to wedge it in back of the clutch pawl as shown in Fig. 3. Raise the brush rod to its highest position. Exercise care when raising a brush rod which has a tendency to bind. Failure to observe this warning may result

in damage to the brushes. Place a finger under the compensator to support the brush rod in its descent. Lower the brush rod slowly and evenly and see that it follows the movement of the finger without sticking or binding during its entire travel.

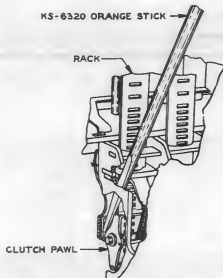


Fig. 3 - Method of Blocking Clutch Pawl

**2.04 Brush Rod Bearing Gap: Fig. 2(B) —**

The bearing halves shall be placed as closely together as possible without causing the brush rod to bind and the gap between the bearing halves at both front and rear of the bearing shall be

Max 0.005 in.

Gauge by eye.

**2.05 1-Type Guide Location (Sender Selectors Only)**

(a) Fig. 4(A) — Throughout the length of travel of the brush rod, the prongs of the guide may touch the front or the rear of the guide rod, but shall not bind at these points. Gauge by eye.

(b) Fig. 4(B) — The closed side of the guide shall clear the guide rod throughout the length of travel but the guide rod shall be wholly within the prongs of the guide.

Gauge by eye.

(c) Fig. 4(C) — With the rack index number 101 showing just above the clutch sighting plate, and with the weight of the brush rod assembly resting on the clutch pawl, the clearance between the top of the guide and the bearing parts shall be  $\frac{3}{64}$  inch.

Gauge by eye.

(d) As far as possible, without interrupting service, requirement (c) shall be checked or adjusted with all other brush rod assemblies on the frame resting on their clutch pawls.

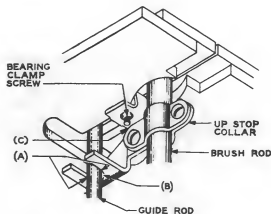


Fig. 4 - 1-Type Guide Location

## 2.06 Brush Stud Gap: Fig. 5(A)

(a) With the brush centered on the reference terminal of the bank, the stud gap shall be

**Test** — Min 0.005 in.

**Readjust** — Min 0.008 in.

Use the KS-6320 orange stick to push the inner spring outward and gauge by eye the amount of travel of the inner spring before the outer spring starts to move. In doubtful cases, use the No. 86 gauge.

(b) The stud shall not touch the adjacent sleeve spring at any other terminal of the bank.

Gauge by eye.

**2.07 Brush Spring Tension:** Fig. 5(B) — With the brush centered on the reference terminal of the bank, the tension of each spring shall be

**Test** — Min 25 grams, Max 50 grams

**Readjust** — Min 30 grams, Max 45 grams

Use the No. 68D gauge, as shown in Fig. 6.

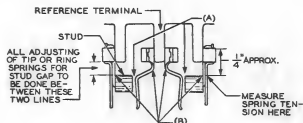


Fig. 5 - Brush Stud Gap and Brush Spring Tension

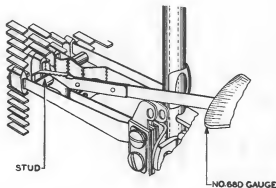


Fig. 6 - Method of Measuring Tension of Brush Springs

**2.08 Brush Intrusion:** Fig. 7(A) — When the brush is on any terminal in the bank, the contacting surfaces of the springs shall project in from the end of the terminal not less than half and not more than the full width of the shoe. This requirement may be checked at the top, bottom, and middle of the bank. It will be

satisfactory if this requirement is slightly exceeded at the top or bottom of the bank in isolated cases, provided these cases are not due to any general misalignment of the bank.

Gauge by eye.

### 2.09 Parallelism of Contacting Surface of Tip, Ring, and Sleeve Brush Springs:

Fig. 7(B) — When the brush is contacting with the reference terminal, the deviation from parallel between the contacting surface of the tip, ring, or sleeve spring and the contacting surface of the terminal shall be as small as possible. In any case, when the brush intrusion equals the full width of the shoe, the shoe shall not toe out more than 0.005 inch and it shall not toe in. If the brush intrusion is less than the full width of the shoe, the amount that the shoe may toe out is proportional to the amount of brush intrusion, being max 0.0025 inch when the brush intrusion equals one half the width of the shoe.

Gauge by eye.

To check this requirement, use the No. 510C test lamp as shown in Fig. 8, as an aid in determining whether or not the contacting surfaces of the brush springs are parallel to the contact surfaces of the bank terminals.

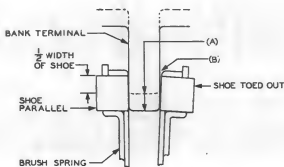


Fig. 7 — Brush Intrusion and Parallelism of Brush Springs

### 2.10 Vertical Location of Sleeve Springs of Upper Brush on Each Rod: Fig. 9(A)

- (a) **22- and 42-point District Finders:** With the rack index number 10 for the 22-point bank or 20 for the 42-point bank showing just above the clutch sighting plate, and with the

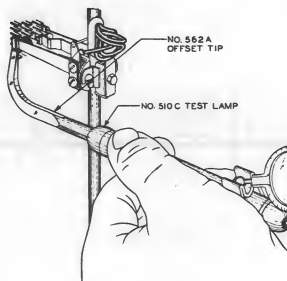


Fig. 8 — Method of Checking Parallelism

weight of the brush rod assembly resting on the clutch pawl, the upper edge of the contact portion of the spring shall extend above the upper edge of the reference terminal (number 10 for 22-point or number 20 for 42-point district banks) by

Min 0.015 in., Max 0.035 in.

Gauge by eye.

- (b) **100-point Sender Selector:** With the weight of the brush rod assembly resting on the clutch pawl, the upper edge of the contact portion of the spring shall extend above the upper edge of bank terminals 2, 49, and 97 by the following limits:

| TERMINAL<br>NUMBER | RACK INDEX<br>NUMBER | LIMITS (INCH) |       |
|--------------------|----------------------|---------------|-------|
|                    |                      | MIN           | MAX   |
| 2                  | 2                    | 0.005         | 0.045 |
| 49                 | 49                   | 0.015         | 0.035 |
| 97                 | 97                   | 0.005         | 0.045 |

Gauge by eye.

**Note:** Where difficulty is experienced in checking this requirement due to the lack of contrast between the fiber and the contacting surface of the brush shoe, proceed as covered in 3.003.

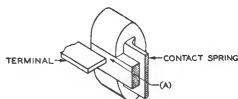


Fig. 9 - Nonbridging Sleeve Spring Location

### 2.11 Vertical Location of Sleeve Springs of Lower Brush on Each Rod and Tip and Ring Springs of All Brushes: Fig. 10 (A)

(a) **Test:** The upper edge of the contact portion of the spring shall not be below the upper edge of the terminal and the lower edge of the contact portion of the spring shall not be above the lower edge of the terminal when the weight of the brush rod assembly is resting on the clutch pawl for any position on the bank.

Gauge by eye.

(b) **Readjust:** With the pawl engaging the notch in the rack corresponding to the reference terminal, and with the weight of the brush rod assembly resting on the clutch pawl, the upper edge of the contact portion of the brush spring shall be min 0.015 inch (3/4 thickness of terminal) above the upper edge of the reference terminal and the lower edge of the contact portion of the brush spring shall be min 0.015 inch below the lower edge of the reference terminal.

Gauge by eye.

**Note:** Where difficulty is experienced in checking this requirement due to the lack of contrast between the fiber and the contacting surface of the brush shoe, proceed as covered in 3.003.

### 2.12 Downstop Collar Location: Fig. 11 (A) —

With the rack index number "0" showing just above the clutch sighting plate and with the weight of the brush rod assembly resting on the clutch pawl, the clearance between the bottom of the downstop collar and the bearing shall be

Min 1/8 inch

Gauge by eye.

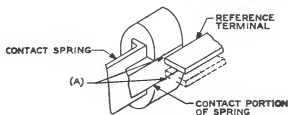


Fig. 10 - Ring, Tip, and Sleeve Spring Location

2.13 **Compensator Location:** Fig. 11 (B) — The compensator shall be clamped securely to the brush rod and there shall be no clearance between it and the downstop collar.

Gauge by eye and feel.

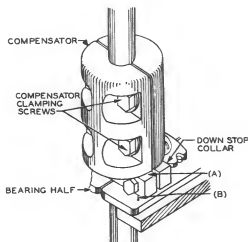


Fig. 11 - Downstop Collar and Compensator Location

### 2.14 Upstop Collar Location

(a) **22- and 42-point District Finders:**

Fig. 12 (A) — With the rack index number 23 for the 22-point district finder or 43 for the 42-point district finder showing just above the clutch sighting plate, and with the weight of the brush rod assembly resting on the clutch pawl, the clearance between the top of the upstop collar and the bottom of the bearing plate shall be 3/64 inch.

Gauge by eye.

- (b) As far as possible, without interrupting service, requirement (a) shall be checked or adjusted for with all other brush rod assemblies on the frame resting on their clutch pawls.

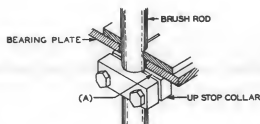


Fig. 12 - Upstop Collar Location

**2.15 Smooth Brush Travel:** When making contact with the bank terminals and traveling up and down in normal operation, each brush shall meet the following conditions:

- (a) It shall run smoothly over the bank terminals without chattering.
- (b) It shall not snag against the bank terminals.
- (c) It shall not ride off the bank terminals.

Gauge by eye.

To check this requirement, proceed as follows. With the brush rod normal, block the clutch pawl by means of the KS-6320 orange stick as covered in requirement 2.03. Run the brush rod up and down slowly by hand and note if any of the spring contacts catch on the terminals on any part of the bank.

### 3. ADJUSTING PROCEDURES

#### 3.001 List of Tools, Gauges, and Materials

| CODE OR<br>SPEC NO. | DESCRIPTION                  |
|---------------------|------------------------------|
| TOOLS               |                              |
| 206                 | 30-degree Offset Screwdriver |
| 207                 | 90-degree Offset Screwdriver |
| 328                 | Guide Adjuster               |
| 329                 | Guide Holder                 |

| CODE OR<br>SPEC NO. | DESCRIPTION                                                                                    |
|---------------------|------------------------------------------------------------------------------------------------|
| TOOLS               |                                                                                                |
| 331                 | Spring Adjuster                                                                                |
| 376A                | Dental Mirror                                                                                  |
| 380A                | Brush Spring Adjuster                                                                          |
| 489A                | Stud Adjusting Pliers                                                                          |
| 510C                | Test Lamp [Must Be Equipped With a No. 562A Offset Tip and a W2BL (48V) Cord]                  |
| 555A                | 3/16-in. Hex. Socket Wrench                                                                    |
| KS-2631             | 4-1/2-in. Screwdriver                                                                          |
| KS-2632             | Reading Glass                                                                                  |
| KS-6320             | Orange Stick                                                                                   |
| R-2830              | Brush Spring Adjuster                                                                          |
| —                   | 3-in. Cabinet Screwdriver                                                                      |
| —                   | 6-1/2-in. P-long-nose Pliers                                                                   |
| GAUGES              |                                                                                                |
| 68D                 | 70-0-70 Gram Gauge                                                                             |
| 86                  | 0.005-in. and 0.008-in. Double-end Right-angle Offset Thickness Gauge                          |
| MATERIALS           |                                                                                                |
| KS-2423             | Cloth                                                                                          |
| KS-7860             | Petroleum Spirits                                                                              |
| KS-14694            | Scouring Pad                                                                                   |
| —                   | Rubber Band                                                                                    |
| —                   | Dixon's No. G712 Graphite Lubricating Stick (The Joseph Dixon Crucible Co., Jersey City, N.J.) |

**3.002 Use of Reading Glass and Dental Mirror:** The KS-2632 reading glass and the No. 376A dental mirror may be used in connection with the visual inspections specified in Part 2, Requirements and the corresponding adjusting procedures.

**3.003** To clean brush shoes, proceed as covered in the section on cleaning and treating of panel multiple bank terminals and associated multiple brushes and guide combs.

**3.01 Rack Tongue Position** (Reqt 2.01)

(1) If the rack tongue does not assume its correct position in the brush rod, it is either distorted or the brush rod is twisted. If the rack tongue is distorted, straighten it with a pair of long-nose pliers. If the brush rod is twisted, loosen all the brushes with the No. 555A wrench and turn the rod to its correct position; then relocate all the brushes in accordance with the requirements for this apparatus or in Section 026-120-701.

**3.02 Rack Coupling Pin Engagement** (Reqt 2.02)

(1) If the rod appears to bind on the rack coupling pin, that is, if the rod does not return to the shoulder of the rack or the rack bearing washer when raised and released, first make certain that this is not caused by a binding or bowed brush rod (see 3.03). If the brush rod is not binding or bowed, uncouple the rack and examine the coupling pin to see that it is not bent; also see that there are no short bends in the lower end of the brush rod. Check to see that there are no burrs or dirt in the hole in the brush rod, and that the hole is large enough to permit the rack coupling pin to enter freely.

(2) If the brush rod is worn at the bottom so that it does not twist freely on the rack shoulder, it will be necessary to recondition the brush rod as covered in Section 026-125-806.

**3.03 Freedom of Movement of Brush Rod** (Reqt 2.03)**3.04 Rack Rod Bearing Gap** (Reqt 2.04)

(1) Before making any adjustments, check to see that there is no interference caused by the commutator brush local cable form coming in contact with a commutator or the form snagging on an adjacent brush frame.

(2) Binding of the brush rod may be caused by dirt accumulations on the rod or by improper mechanical adjustment. If the bind is due to dirt accumulations, treat the surfaces of the rod with Dixon's No. G712 graphite lubricating stick as follows. Where graphite has not previously been used, clean all accessible portions of the rod above the brushes with a KS-2423 cloth moistened with KS-7860

petroleum spirits, taking care to keep on those portions of the rod at least 1 inch from the brushes. Raise the brush rod and similarly clean the portions of the rod below the brushes which engage the bearings when the rod is normal. Then apply graphite to the rod as covered in (3). Where graphite has previously been used, subsequent cleaning of the brush rod with the cloth and petroleum spirits will ordinarily not be necessary.

(3) With the brush rod in the normal position, apply Dixon's No. G712 graphite lubricating stick over the front and side surfaces of the rod with a downward motion and moderate pressure. Three such strokes will usually be sufficient. Take care to keep on that portion of the rod at least 1 inch from the brushes and bearings. Repeat this operation for each section of the rod. Then rub the rod lightly with a dry KS-2423 cloth so as to distribute the graphite over all accessible portions of the rod.

(4) When the cloths become dirty, discard them in a suitable container.

(5) If a bind sufficient to prevent the brush rod from meeting this requirement occurs at or near the top of the brush rod travel, the cause may be a misaligned clutch, or on sender selectors, a binding guide.

(6) To determine the cause, uncouple the rack and raise the brush rod as high as it will go. If the bind is still present, it may be caused by a misaligned guide. If so, readjust as covered in 3.05.

(7) If the clutch is out of alignment, correct as covered in the section covering the type of clutch involved. Then recheck the commutator brush and all the other brushes on the rod for height, as the adjustment for alignment will have changed the position of the clutch.

(8) If the brush rod binds only in spots through its travel, the binding may be caused by interference between the bearings. Stop the rod on one of the binding spots and check each bearing, in turn, for play in a straight front to rear direction by grasping the rod in the fingers directly below the bearing and moving it backwards and forwards and then from side to side. If the bearing does

not show a perceptible play, check that the bearings meet requirement 2.04.

(9) If the requirement is not met, before separating the halves of a bearing, make sure that the bind is not caused by misalignment of the bearing halves. If the bind is due to the displacement of one-half of the bearing with respect to the other half, correct by lightly tapping the bearing halves with the screwdriver handle.

(10) Close bearings that are open more than the permissible amount by tapping the bearing half into the correct position with the 3-inch cabinet screwdriver. Always dress the bearing halves to the left and to the rear. Do not pry against the adjacent bearings. A light held below the bearing locating plate will be found of considerable help in checking for open bearings.

(11) What may seem to be a uniform bind throughout the travel of the brush rod is probably caused by excessive brush spring tension. Check the tension of all brush springs and where they are found to be excessive or close to the maximum requirements, reduce them slightly as covered in 3.07. Try to apportion the adjustment so as to set each spring approximately at its mean requirements rather than to reduce any one spring to its minimum requirements, also check the tension of the commutator springs as covered in Section 026-120-701.

(12) Such binds as are caused by kinks and bends in the brush rod will also be noticed as occurring only in certain spots during the travel of the rod. If there is front to rear play and side play in every bearing and if there is no bind due to interference with the guide or a misaligned clutch or what seems to be a bind due to heavy brush spring tension, examine the rod carefully to ascertain whether it is straight throughout its entire length. If kinks or bends are located, straighten the rod by grasping it in the fingers above and below the bend portion and bowing the rod in a direction to correct the bend. Be careful to leave the rod straight and not to leave any kinks in it. After straightening the rod, check for requirements 2.07, 2.08, 2.10, and 2.11. If the fault cannot be discovered in any other way, remove one pair of bearings at a time. With a

bearing removed in this manner, that part of the rod which is bowed will be plainly shown by its position with respect to the bearing supporting plate. After making this check, remount the bearing before removing another bearing.

### 3.05 1-Type Guide Location (Sender Selectors Only) (Req't 2.05)

- (1) When a guide binds on a guide rod in the ascent or descent of the brush rod, place the No. 329 holder with its slot down over the back end of the guide and over the rod to secure it firmly as shown in Fig. 13 and adjust the guide with a No. 328 adjuster.
- (2) Should the guide rod appear bent so as to cause the guide to bind in only one or two points, straighten the guide rod at these points.
- (3) If the clearance between the inverted guide and the bearing parts is not as specified, slightly loosen the guide clamping screws with the KS-2631 screwdriver and slide the guide up or down as required, then tighten the screws securely.

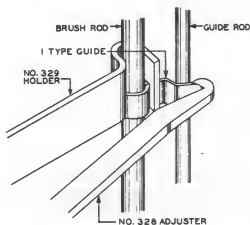


Fig. 13 — Method of Adjusting 1-Type Guide

### 3.06 Brush Stud Gap (Req't 2.06)

- (1) Unless the sleeve springs are distorted, adjust the stud gap by adjusting the outside springs as shown in Fig. 14, using the No. 331 adjuster. Use extreme care in making



the necessary corrections and make an effort to restore the spring to its correct condition as shown in Fig. 5.

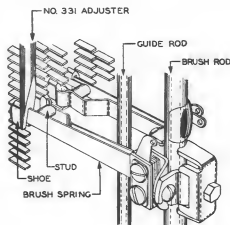


Fig. 14 - Method of Adjusting for Brush Stud Gap

### 3.07 Brush Spring Tension (Reqt 2.07)

- (1) Adjust the spring tension with the No. 380A adjuster close to the point where the spring leaves the assembly clamping plates and insulators.
- (2) When making any adjustment of brush springs, exercise care to prevent any distortion or kinking of the springs, thereby affecting their relation with the associated bank terminals.

### 3.08 Brush Intrusion (Reqt 2.08)

- (1) If failure to meet this requirement is common to several adjacent brushes on one bank, it is an indication that the bank is out of alignment. Where the cases of failure are isolated, make a check to see whether or not the brush rod is bent in or out and if so, straighten the brush rod. If, however, the brush rod is straight and this condition exists, do not bend the brush rod to correct it. It is sometimes possible to correct the above conditions by moving the brush rod bearings. Since the brush itself

is not involved in this adjustment, do not adjust it to meet this requirement. If, however, any of the adjustments covered above are made, check the brushes for requirements 2.10 and 2.11. It is satisfactory if in isolated cases a brush only approximately meets the requirement at the top or bottom of the bank provided it meets it at the reference terminal and provided a check is made with other brushes to insure that failure to meet the requirement is not due to misalignment of the bank.

### 3.09 Parallelism of Contacting Surface of Tip, Ring, and Sleeve Brush Springs (Reqt 2.09)

- (1) Adjust the brush springs at a point in front of the studs with the No. 331 adjuster so that the contacting surfaces of the shoes are parallel to the terminals or toe out slightly, but do not toe in (see Fig. 15). Recheck requirement 2.06. It may be necessary in some cases where the shape of the spring has been changed to decrease the effective length of the stud. To do this press the stud on the stud mounting pin using the No. 489A stud adjusting pliers. In using these pliers, engage the stud with the tip of the pliers and press the stud onto the stud mounting pin as far as permitted by the stop between the jaws of the pliers as shown in Fig. 16. Make sure that the stud mounting pin does not protrude beyond the stud and short-circuit the springs.

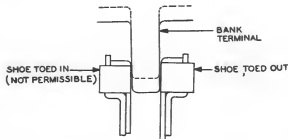


Fig. 15 - Illustrating Toe In and Toe Out Condition of Brush Shoes

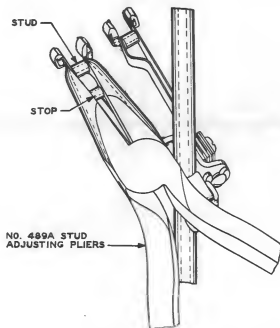


Fig. 16 – Method of Decreasing Effective Length of Stud

adjustment as this will be likely to injure the finish or distort some part of the brush assembly.

(3) Center the brush as accurately as possible in its horizontal position so that the spring tensions are approximately equal and securely tighten the brush clamping bracket screw. In order to minimize the necessity for adjustment on terminals 2 and 97 on 100-point sender selectors, adjust the sleeve spring of the upper brush as nearly as possible to the mean of the limits on the reference terminal.

(4) At this time, observe the setting of the tip and ring springs. As a rule it is possible to set the sleeve spring so that all springs will satisfactorily meet their requirements.

(5) If the correct adjustment of the tip and ring springs cannot be obtained by this method, loosen the lower assembly screw with the No. 206 or 207 screwdriver and raise or lower the spring at fault with the No. 380A adjuster as required. If difficulty is experienced in using the No. 380A adjuster, use the R-2830 adjuster instead because the spring is wider than the jaws of the adjuster. After this adjustment, tighten the assembly screws securely and recheck the sleeve spring adjustment provided the tip or the ring spring has been shifted. After making this adjustment, check to see that requirement 2.11(a) can be met on the sleeve springs of the lower brushes and the tip and ring springs of both upper and lower brushes at other points in the bank. If the brush fails to meet this requirement, it is probably due to a displacement of the bank terminals. Correct this in accordance with Section 026-110-701.

**3.10 Vertical Location of Sleeve Springs of Upper Brush on Each Rod (Reqt 2.10)**

**3.11 Vertical Location of Sleeve Springs of Lower Brush on Each Rod and Tip and Ring Springs of All Brushes (Reqt 2.10)**

(1) If these requirements are not met, and the brush rod is coupled to a No. 1B rack, first ascertain that the brush rod is not worn excessively at the bottom where it rests on the shoulder of the rack. If necessary, recondition the lower end of the brush rod as covered in Section 026-125-806.

(2) If the sleeve springs of the upper or lower brush are not within the specified limits, loosen the brush clamping bracket screw with the No. 555A wrench sufficiently to permit the adjustment to be made by tapping the shank of the wrench up or down as required. Do not tap the frame of the brush in making this

**3.12 Downstop Collar Location (Reqt 2.12)**

**3.13 Compensator Location (Reqt 2.13)**

(1) If the clearance between the bottom of the downstop collar and the bearing plate is not as specified, loosen the downstop collar and compensator clamping screws with the No. 555A wrench and shift the collar and compensator up or down as required. Before securely tightening the clamping screws, see that the compensator fits down snugly against the downstop collar.

**3.14 Upstop Collar Location** (Reqt 2.14)

(1) To readjust the upstop collar for position, shift it on the rod as required using the No. 555A wrench to loosen and tighten the stop collar clamping screw.

(2) Also check to see that, when the brush rod is raised so that the upstop collar makes contact with the bottom of the bearing plate, the brushes do not run off the topmost terminals. If this should occur, the brush or terminals will be damaged when the down drive is applied because it will not be guided back to the terminals, but will snag on the top-

most terminals. Remedy this by raising the stop collar nearer its minimum limit.

**3.15 Smooth Brush Travel** (Reqt 2.15)

(1) Correct chattering or snagging by adjusting the springs causing the trouble so that their contact surfaces meet requirement 2.09. Use the No. 380A adjuster for this purpose. At this time, check the correct location of the multiple bank terminals in accordance with Section 026-110-701.

(2) If the brush still chatters or snags, replace it in accordance with Section 026-125-806.

